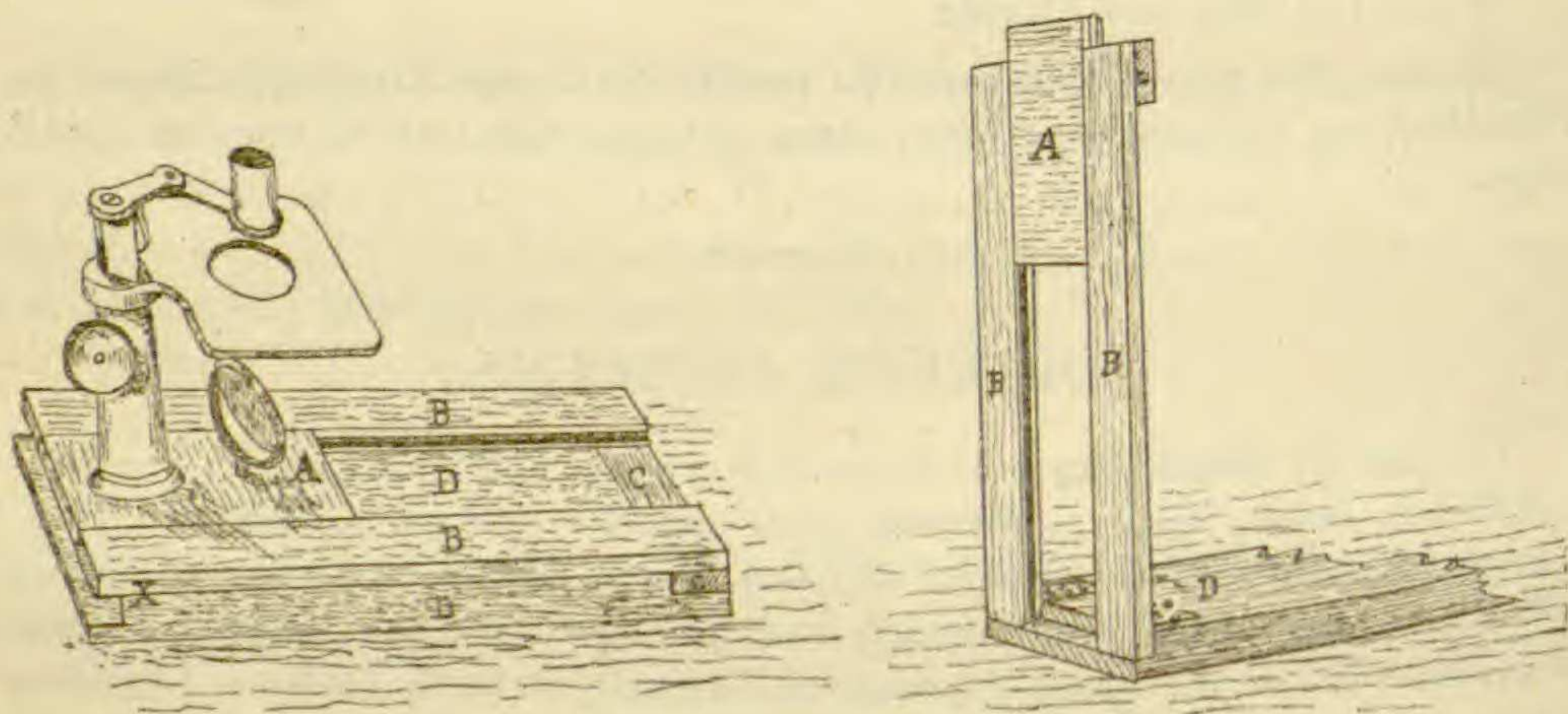


those which I have examined from Europe, and differ from those which I found in California, of which a notice was published in the *BOTANICAL GAZETTE* of September, 1885, in having isolated, light yellow sori instead of the aggregated, or somewhat concentric, and dark brown, almost black sori found in the affected hollyhocks of Santa Barbara. The fungus from Beverly is of interest not only because very little is known of the occurrence of *P. Malvacearum* in the Eastern States, but also because in this case we have an accurate record of the advent of the fungus. The disease was unknown at Beverly until the present year, and was imported with some seeds of Malope from Europe last season. At present the disease is confined to the Malope and hollyhocks of Prof. Jackson's garden and that of one of his neighbors, other gardens being free from the disease.

W. G. FARLOW.

Making drawings with a dissecting microscope.—The apparatus consists of a Zentmayer's dissecting microscope, the Rothrock model, the round metal base being replaced by a wooden one, which is made as follows: A heavy board (D in figure) 6×12 inches, having a shoulder cut at each end, forms the ground work; to this are hinged on either side at X, the two strips B B, each $1\frac{1}{2} \times 12$ in. and grooved on their inner edges; these are bound together by the strip C; between the strips B B is placed the piece marked A, which is tongued to fit the grooves. Two holes are made in A, one to receive the screw at the base of the microscope, the other for the attachment of the mirror. When the object is prepared for drawing, A is carried forward to C, and then raised with B B into a position at right angles with D, the weight of the microscope and the shoulder at the end of D keep this portion in position.



A Wollaston's camera lucida is now placed over or rather back of the lens and the object drawn in the usual way.

The lenses used are a one inch and a one-half inch achromatic triplets having special adapters for fitting into the arms of the microscope stand and for receiving the camera lucida. Mr. Zentmayer has made these fittings or adapters under my direction, and modified the mounting of the camera slightly, making it more convenient for use than in its usual form.

The piece A can be raised or lowered and fixed at any point so that various degrees of enlargement in the drawing are secured. Upon the stage I have a piece of plate glass $1\frac{1}{2} \times 3$ in. upon which my dissections are usually made. A space in the center of this glass slip is ruled to millimeters, twenty-five millimeters each way. This ruling, as made for me by J. W. Queen & Co., does not interfere at all with the work of dissecting, while it enables one to measure in the easiest possible way any object on the plate, and in making the drawings the scale of enlargement is always before you and can be noted in a moment. The slip of glass is held to the stage by spring clips which are attached to the stage but are not shown in the figure.

In making drawings for photo-engraving it is essential that the lines be black. For this purpose Higgins' American drawing ink is very good. An excellent pen for very fine work is No. 1459 of Kenuff & Esser.

F. LAMSON SCRIBNER.

Plan for laboratory work in Chemical Botany.*—Chemistry furnishes the means for investigating plants. The chemical study of a plant includes not only macro- and micro-chemical work, but also gross and minute anatomy study. Two years ago when I saw Prof. Goodale repeat Pfeffer's experiment of putting together certain constituents and building up a cell, I also saw that cell form was not fundamental, but that construction lay back of form and determined it. Form is a property of a substance, so to speak. If this is so, even the study of anatomy falls under chemistry and it determines how a plant shall be investigated.

Organic chemistry has two departments. As a special and not an inclusive subject, it investigates elements and compounds in themselves and in their relation to each other apart from their place of occurrence. When a study is made of the combination and relation of these substances under what is generally termed life, botany has been entered upon. That is to say, that department of organic chemistry termed the proximate analysis of plants is divisible. One of its subdivisions really belongs to botany and should be relegated to it.

Whatever may be true in other countries, the chemical plant study now being done in America is not alone imperfect in results but *methods*. The chemist extracts the various compounds from the plants and examines them without regard to their relation to the plant. The botanist does little better. With the highest power of his microscope, he entirely misses many of the constituents of the plant. It would seem as if there ought to be a combination of these two modes of investigation, that is, that macro-chemical study of the plant should be accompanied by a micro-chemical study. One who has ascertained the presence and quantity of the more important constituents is prepared to trace these substances in its various tissues. The comparative study that is then possible needs no emphasis.

On page 179 of the July number of the BOTANICAL GAZETTE I gave a scheme of analysis in which macro- and micro-chemical work are combined. I shall not repeat it here, but an examination of that scheme will be necessary

* Read before the A. A. A. S., Buffalo meeting, 1886.